

Factors affecting patients' behaviors toward prosthodontic treatment needs in Saudi Arabia

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ABSTRACT

Background: There are many factors could have an effect on patient's behavior and treatment decision to complete their essential prosthodontic treatment needs, numerous studies have been conducted globally to determine the main reason behind neglecting prosthodontic treatment, but not enough information was found among patients in Saudi Arabia. The main aim of this study is to identify the main factors that could influence patient's decision and attitude toward completing their prosthodontic treatments. **Methods:** This cross-sectional study included 1200 adult participants. This study conducted between January 2021 and October 2021. Data was collected using an online self-administered questionnaire targeting all citizens and residents in Saudi Arabia. Data was collected and enter on the "Microsoft Office excel software" program (2016) for windows then analyzed using (Statistical Package of Social Science Software (SPSS) program, version 20. **Results:** There were 1,200 participants in the study, with 40.8% of men and 59.2% of women. Between the ages of 20 and 30, 54.3% of the population is between the ages of 20 and 30. Other than wisdom teeth, 61.8% of all subjects had tooth/molar teeth removed. 61.3% of the individuals have had root canal therapy in the past. **Conclusion:** There was a strong relationship between age, residency, educational level, and occupation and entire intention to complete the prosthetic therapy. Financial or economic condition appears to be the primary predictor that may have an impact on individuals' intentions and behaviors about their need for prosthodontic therapy.

Keyword: Prosthesis, Patients Behaviors, Attitudes, Replacement

1. INTRODUCTION

Prosthodontics, also known as dental prosthetics or prosthetic dentistry, is the branch of dentistry concerned with the diagnosis, treatment, planning,



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rehabilitation, and maintenance of oral function, comfort, appearance, and health of patients suffering from clinical conditions provoked by missing or deficient teeth or oral and maxillofacial tissues using biocompatible substitutes (Chowdhury & Chakraborty, 2017). Many prosthetic treatment options, such as removable, fixed, or implant-supported prosthesis, may be offered for a specific clinical circumstance (Shrirao et al., 2016). With the rapid increase in oral health and the lowering of edentulism in many nations over the last few years, an increasing number of people are keeping more teeth later in age. However, as patients become older, they require more prosthodontic rehabilitation, especially if they have poor oral health and have lost all of their teeth, which is known as full misfortune or edentulism (Assery, 2019).

Perceived potential benefits and risks of treatment include self-assessment of risks and benefits as part of a context in which the potential patient considers whether favorable factors or positive results are likely to occur after completion of treatment (eg, improved chewing, aesthetics, self-esteem). This category also takes into consideration whether positive aspects overcome the perceived risks involved both with the execution of treatment and with the likelihood of complications and treatment failure in the long-term, such as damage to remaining teeth, risk of surgery and postoperative complications, risk of early treatment failure, worsening of the current condition, and other potential problems (Vieira & Leles, 2014). In 2007, research was conducted on “Attitudes towards Replacement of Teeth among Patients at the Institute of Dental Sciences” in India. Dr Kamal Shigli reported that 20% of patients addressed financial restrictions as a cause for not replacing teeth, 7.1% expressed a lack of time, 6.9% reported they don't need treatment, and 3.8% mentioned a lack of awareness about treatment choices for tooth replacement (Shigli et al., 2007).

Furthermore, another study in Saudi Arabia showed that the predominant reason for patients refusing prosthesis treatment is cost issues among (38.90%) followed by lack of knowledge in about (23.15%) (Chowdhury & Chakraborty, 2017). In regards to the choice of different types of treatment, damage to the surrounding tooth has been one of the most important criteria as reported by Firas A Al-Quran (Al-Quran et al., 2011). About implant treatment option, patients were most hesitant to choose because of unknown adverse effects (11.7%), followed by financial constrictions (9.7%), surgical risks (8.7%), post-insertion problems (4%), procedure's complications (1.7%) (Al-Dwairi et al., 2014).

Limited data are available in this context in Saudi Arabia. Hence, the primary aim of conducting this study is to identify the most common and major factors affecting patients' decision and behavior toward completing their prosthodontics treatment plan among individuals living in Saudi Arabia. The primary objective is to determine the major factors (Predictors) that would have potential influence on individuals' intention and behaviors towards their needs of prosthodontics treatment. In addition, to measure the association between treatments needs neglection/acceptance and care to the individuals' socioeconomic status, geographic location, gender and age, also the location of missing teeth in arch.

2. MATERIALS AND METHODS

This is a cross sectional study conducted between January 2021 and October 2021. Questionnaire-based, that assesses the patient's decision and willingness toward completing their prosthodontic treatment needs among individuals in Saudi Arabia. Sample recruitment will be based on using social media platforms (Twitter, Snapchat, Instagram, WhatsApp, Facebook...) to simple recruit the participants from all over Saudi Arabia. This is because of Covid-19 precaution and social distancing during the period of data collection of this study.

The data collection started from February 2021 to October 2021, with a target sample of 384 patients (Confidence level 95%, margin of error 5%). In addition to the following inclusion criteria: Saudis or non-Saudis, minimum age 18 years old (partially or completely edentulous patients or completely dentate patients required prosthodontic treatment, such as: crown of endodontically treated teeth, esthetic or restorative treatment).

The questionnaire was sent online to be self-administered in Arabic language. All the participants answered the questionnaire anonymously after getting their consent to participate voluntarily at the beginning of the questionnaire. For those who refused to participate and/or completely dentate patients, or already completed their prosthodontic treatments (missing teeth have been replaced). Also, patients of less than 18 years were excluded from this study.

The questionnaire contained a close-ended question and multiple choices, the questionnaire is consisting of 26 questions divided into 3 sections; Section A contains the consent form. Section B of the survey discuss personal demographic data of the participants regarding age, gender, city, nationality and it also ask about sociodemographic factors and assess the socioeconomic position of the patients based on their educational level, monthly income, and occupation. Section C: consist of 9 questions ask about previous and current dental condition and the time of treatment, such as extraction and/or previous endodontic treatment. This section consists of questions with three-point scale (yes, no, do not know). It also includes figures of dental arches (both maxilla and mandible) with

teeth numbered according to universal teeth numbering system, all third molars are excluded from the chart, this allows the participants to easily choose the intended teeth and determine the exact location of treated/excreted teeth in the arch.

Finally, section D: includes nine yes/or no questions regarding the willingness to complete treatment, then the remaining questions ask about the reasons behind refusing to complete treatment (financial reason, did not feel need, no time, no available clinics, fear from surgical part *for implants*, fear from prosthesis failure; bad odor, fake appearance). Last questions have a range of Yes” and “No” answers, assess patient’s knowledge about the current improvements and evolution in dental prosthodontic field. The data was collected and analyzed using SPSS version 21 (IBM Corp., Armonk, NY, USA). Chi Square test was used for statistical analysis, and a probability value of less than 0.05 was to be statistically significant.

3. RESULTS

According to table 1; the study included 1200 participants, 40.8% of study sample were males and 59.2% were females. 54.3% aged between 20- 30 years old. 38.3% of all participants were from central region in the kingdom while 31.8% were from western region. Only 62% had bachelor degree and 11.3% had master or board education. 10.3% had very low family income, 18.5% moderate and 21.8% had high income.

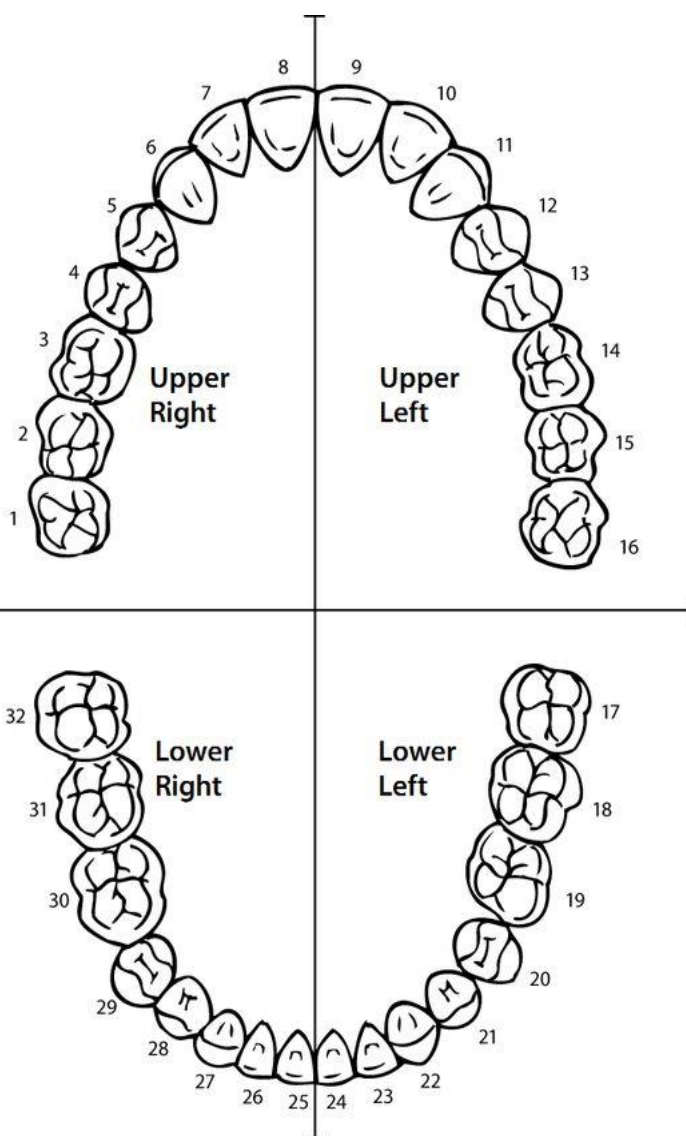
Table 1 Sociodemographic characteristics of participants (n=1200)

Parameter		No.	Percent
Gender	Male	489	40.8
	Female	711	59.3
Age	Less than 20	72	6.0
	20 - 30 years old	651	54.3
	31 - 40 years old	249	20.8
	41 – 50 years old	132	11.0
	51 – 60 years old	75	6.3
	More than 60	21	1.8
Nationality	Saudi	1107	92.3
	Non-Saudi	93	7.8
Living area	Central Region	459	38.3
	Eastern Region	30	2.5
	northern area	36	3.0
	Southern area	294	24.5
	Western Region	381	31.8
Education	high school	174	14.5
	Bachelor's degree	744	62.0
	diploma	66	5.5
	Masters or board	135	11.3
	PhD	48	4.0
	other	33	2.8
Monthly income of the head of the family	less than 5000	243	20.3
	5000-7,700	123	10.3
	7,800-10000	150	12.5
	10000-15000	222	18.5
	15000-20000	201	16.8
	20000 or more	261	21.8
Occupatio n of the Head of the family	private business	162	13.5
	private sector employee	189	15.8
	public employee	648	54.0
	Unemployed	201	16.8

In table 2; 61.8% of all participants had a tooth/ molar extracted other than a wisdom tooth. 79.9% reported tooth extraction for longer than a year, 9.1% a year ago, 4.8% from 3- 6 months ago and 6% less than 3 months. 61.3% of the participants previously treated the root canal. 79.3% reported root canal treatment for longer than a year, 10.2% a year ago, 5.1% from 3- 6 months ago and 5.3% less than 3 months. 47.2% of study sample had prosthetic treatment (veneers, crowns, fixed fixtures, bridges, partial or complete movable fixtures, dental implants, veneers. Only 52.5% completed the entire treatment plan and finished it (Figure 1).

Table 2 Knowledge of participants about online nutritional applications and tele-dietetics (n=1200).

Parameter	No.	Percent
Have you ever had a tooth/ molar extracted (other than a wisdom tooth)?	Yes	742
	No	430
	I don't know	28
Write the number of the tooth that you extracted using the picture: (other than the wisdom tooth)	2	21
	3	30
	4	23
	5	5
	6	13
	7	17
	8	10
	9	15
	10	4
	11	14
	12	27
	13	21
	14	81
	15	68
	18	77
	19	93
	20	33
	21	6
	22	7
	23	19
	24	4
	25	3
	26	7
	27	8
	28	20
	29	17
	30	48
	31	51
Since when was the tooth extracted?	less than 3 months	45
	from 3 to 6 months	36
	one year	68
	more than one year	593



Have you previously treated the root canal?	Yes	735	61.3
	No	420	35.0
	I don't know	45	3.8
Write the number of the tooth for which root canal treatment was performed using the diagram shown:	2	3	3.
	3	41	3.4
	4	38	3.2
	5	10	8.
	6	12	1.0
	7	15	1.3
	8	13	1.1
	9	13	1.1
	10	3	3.
	11	7	6.
	12	28	2.3
	13	44	3.7
	14	69	5.8
	15	42	3.5
	18	51	4.3
	19	77	6.4
	20	26	2.2
	21	10	8.
	22	1	1.
	23	5	4.
	24	8	7.
	25	3	3.
	26	10	8.
	27	9	8.
	28	24	2.0
	29	19	1.6
	30	103	8.6
	31	42	3.5
Time starting root treatment	less than 3 months	39	5.3
	from 3 to 6 months	37	5.1
	from one year	75	10.2
	more than one year	583	79.3
Did your doctor tell you that the molar needs to be covered (a crown) after completing the root canal treatment?	Yes	487	40.6
	No	206	17.2
	may be	42	3.5
Have you completed your entire treatment plan and finished it?	Yes	630	52.5
	No	411	34.3
	I don't know	159	13.3

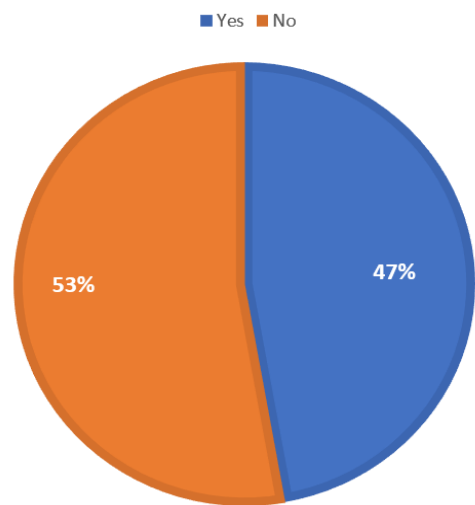


Figure 1 Have you ever done any type of prosthetic treatment (veneers, crowns), fixed fixtures, bridges, partial or complete movable fixtures, dental implants, veneers)?

As illustrated in table 3; only 62% of participants have the full intention to complete the dental treatment (prosthetic) after knowing the price of the treatment and the time it takes for the treatment. Regarding reasons for not having the full intention to complete the treatment, 26.3% don't need treatment, 13.1% because they don't feel pain (56.6% of participants who don't feel pain or don't need treatment know that delayed treatment of missing teeth can negatively affect tooth bite and cause jaw joint pain), 40.7% for financial reason (53.7% of them know that there are another treatment of artificial teeth at varying prices), 19.7% due to length of treatment period (66.6% of them know that there are techniques for treating artificial teeth using a computer in one visit), 15.7% due to fear of carving teeth (65.2% of them If you choose know that there are other options other than dental carving that are more conservative, such as dental implants instead of a bridge and partial prosthesis that do not require carving for the entire tooth), 13.8% for unwillingness for movable prosthodontics, 8.5% due to fear of having a dental implant, and 7.2% because missing teeth do not affect my aesthetic appearance because they are back teeth (60.6% of them know that not replacing the back teeth can lead to the adjacent teeth tilting and causing spaces between the front teeth, as well as erosion in the bone in the place of the missing tooth, so you will need a bone graft if it is not done To replace the tooth during a period of six months after the extraction)

Table 3 Attitude of participants toward completing the prosthetic dental treatment (n=1200).

Parameter		No.	Percent
Do you have the full intention to complete the dental treatment (prosthetic) after knowing the price of the treatment and the time it takes for the treatment?	Yes	744	62.0
	No	456	38.0
Why can't you/or don't have the full intention to complete the treatment?	I don't need treatment	120	26.3
	Financial situation	186	40.7
	Length of treatment period	90	19.7
	I don't feel pain	60	13.1
	Fear of having a dental implant	39	8.5
	Unwillingness for movable prosthodontic	63	13.8
	Missing teeth do not affect the aesthetic appearance of my teeth	33	7.2
	There are no dental clinics	24	5.2

	near my house		
	the fear of carving teeth	72	15.7
	other	81	17.7
If you choose (financial situation), did you know that there are another treatment of artificial teeth at varying prices?	Yes	100	53.7
	No	86	46.2
If you chose (the length of treatment period), did you know that there are techniques for treating artificial teeth using a computer in one visit?	Yes	60	66.6
	No	30	33.3
If you choose (fear of dental carving), did you know that there are other options other than dental carving that are more conservative, such as dental implants instead of a bridge and partial prosthesis that do not require carving for the entire tooth?	Yes	47	65.2
	No	25	34.7
If you choose (I don't feel pain, I don't need treatment), did you know that delayed treatment of missing teeth can negatively affect tooth bite and cause jaw joint pain?	Yes	34	56.6
	No	26	43.3
If I chose (missing teeth do not affect my aesthetic appearance because they are back teeth), did you know that not replacing the back teeth can lead to the adjacent teeth tilting and causing spaces between the front teeth, as well as erosion in the bone in the place of the missing tooth, so you will need a bone graft if it is not done To replace the tooth during a period of six months after the extraction?	Yes	20	60.6
	No	13	39.3

As illustrated in Table 4; there was a significant correlation between full intention to complete the prosthetic treatment with age (20- 30 years old), residence, educational level and occupation ($P=$ or less than 0.05) but not with gender, nationality or monthly income ($P=$ more than 0.05).

Table 4 Correlation between attitude of participants toward completing the prosthetic dental treatment and sociodemographic characteristics (n=1200).

		Full intention to complete the prosthetic treatment		total	P value
		Yes	No		
Gender	Male	288	201	489	0.066
		38.7%	44.1%	40.8%	
	Female	456	255	711	
		61.3%	55.9%	59.3%	
Age	Less than 20	42	30	72	0.001
		5.6%	6.6%	6.0%	
	20 - 30 years old	363	288	651	
		48.8%	63.2%	54.3%	
	31 - 40 years old	177	72	249	
		23.8%	15.8%	20.8%	
	41 – 50 years old	99	33	132	

	51 - 60 years old	13.3%	7.2%	11.0%	
		48	27	75	
		6.5%	5.9%	6.3%	
Residence region	Central Region	303	156	459	0.001
		40.7%	34.2%	38.3%	
	Eastern Region	24	6	30	
		3.2%	1.3%	2.5%	
	northern area	12	24	36	
		1.6%	5.3%	3.0%	
	Southern area	138	156	294	
		18.5%	34.2%	24.5%	
	Western Region	267	114	381	
		35.9%	25.0%	31.8%	
Nationality	Saudi	675	432	1107	0.012
		90.7%	94.7%	92.3%	
	Non-Saudi	69	24	93	
		9.3%	5.3%	7.8%	
Education	high school	105	69	174	0.001
		14.1%	15.1%	14.5%	
	Bachelor's degree	468	276	744	
		62.9%	60.5%	62.0%	
	diploma	24	42	66	
		3.2%	9.2%	5.5%	
	Masters or board	90	45	135	
		12.1%	9.9%	11.3%	
	PhD	39	9	48	
		5.2%	2.0%	4.0%	
Monthly income	less than 5000	150	93	243	0.035
		20.2%	20.4%	20.3%	
	5000-7,700	78	45	123	
		10.5%	9.9%	10.3%	
	7,800-10000	102	48	150	
		13.7%	10.5%	12.5%	
	10000-15000	117	105	222	
		15.7%	23.0%	18.5%	
	15000-20000	126	75	201	
		16.9%	16.4%	16.8%	
Occupation	private business	171	90	261	0.002
		23.0%	19.7%	21.8%	
	private sector employee	111	51	162	
		14.9%	11.2%	13.5%	
	Governate employee	123	66	189	
		16.5%	14.5%	15.8%	
	Unemployed	408	240	648	
		54.8%	52.6%	54.0%	
		102	99	201	
		13.7%	21.7%	16.8%	

4. DISCUSSION

Motivations for receiving appropriate prosthodontic care are poorly known and are seldom examined for clinical reasons when establishing treatment need and understanding the elements associated to health care demand and effective usage. When analyzing their probable perspectives, thoughts, and attitudes about prosthodontic therapy, common elements of patients' treatment-seeking behavior can be found. Given that these elements may have an impact on a person's intention to treat as well as his or her actual conduct, ranging from seeking treatment to selecting a prosthodontist and being properly treated (Al-Dwairi et al., 2014). Comfort, function, and aesthetics are the three primary elements that determine the acceptability and success of prosthetic therapies. Mechanical and organic factors determine comfort and functionality. The patient's recognition of a tasteful viewpoint is influenced by societal influences, as well as a person's frame of mind and conviction (Akeel, 2003). The need for dental prosthesis varies according on the patient's age, gender, employment, financial situation, and education. Rehabilitative treatment is only beneficial when patients are motivated and made aware of the many prosthodontic therapies available, as well as how to use and maintain them (Shetty et al., 2019).

In our study, 61.8% of all participants had a tooth/ molar extracted other than a wisdom tooth and 61.3% of the participants previously treated the root canal. A study in Riyadh, KSA reported that all study participants had missing teeth (Assery, 2019). Other results were reported by Nirmal et al., (2014) 84.3% of study participants had missing teeth. Reddy et al., (et al., 2016) reported that all study participants have missing teeth. Shetty et al., (2019) reported almost similar results as 97.7% of study participants had missing teeth.

The ultimate goal of rehabilitation is patient happiness and oral health improvement; it is regarded to be substantial patient satisfaction and a vital aspect of patient well-being (Petricevic et al., 2012). Tooth loss can cause social disadvantage, as Davis et al., (2000) documented in his study, the results revealed that the majority of the participants who were treated prosthodontically had emotional anguish. Previous research indicates that the chance of requesting and receiving prosthodontic treatment is dependent on the position of the edentulous gaps, as people are more likely to replace anterior missing teeth than posterior missing teeth (Elias & Sheiham, 1998). There is a favorable relationship between missing tooth location and patient happiness with the mouth; moreover, the presence of an intact anterior sextant and at least three premolars in occlusion is the strongest predictor of satisfaction (Elias & Sheiham, 1998). Treatment perceived potential advantages and hazards include self-assessment of risks and benefits as part of a framework in which the potential patient assesses whether favorable factors or good results are likely to occur following treatment completion (eg, improved chewing, aesthetics, self-esteem). This category also considers whether the perceived risks associated with treatment execution and the likelihood of complications and treatment failure in the long run, such as damage to remaining teeth, risk of surgery and postoperative complications, risk of early treatment failure, worsening of the current condition, and other potential risks (Vieira & Leles, 2014).

Previous experiences, particularly traumatic, unpleasant, or painful dental encounters, often as a result of an indifferent dentist, can lead to exaggerated or illogical negative views, since direct experience is the most typical way people develop dental anxiety. Observational learning, on the other hand, develops as a result of witnessing, retaining, and reproducing the behavior of others, which is typically created when individuals hear about others' painful experiences or bad perceptions about dentistry in our culture. Previous good experiences, on the other hand, may influence an individual's attitudes and treatment habits (Vieira & Leles, 2014).

According to our results, only 62% of participants have the full intention to complete the dental treatment (prosthetic) after knowing the price of the treatment and the time it takes for the treatment. Regarding reasons for not having the full intention to complete the treatment, 26.3% don't need treatment, 40.7% for financial reason. This was in agreement with a study in Riyadh, KSA reporting (38.90%) study participants, not having any prosthesis besides absent teeth, the main reason for the absence of prosthesis was money constraints (Assery, 2019). A research by Nirmal et al., (2014) showed comparable results, with the majority of study participants preferring fixed partial prosthesis to replace lost teeth. According to the same research, the primary reason for not seeking prosthetic replacement was financial restraints. In a research by Shetty et al., (2019), the major reason for not replacing lost teeth was the participants' lack of perceived necessity to do so. A previous research done by Reddy et al., (2016) found that financial restrictions were the least prevalent cause for replacing missing teeth and poor information was the most common reason for non-replacement. Shigli et al., (2007) found that 65.8 percent of research participants had prosthesis in their oral cavity, which contradicts the current study.

There is strong evidence that numerous procedures for treating tooth loss utilising conventional and implant treatments are successful for a wide range of prosthodontic demands and clinical scenarios ranging from simple single tooth loss to sophisticated and lengthy therapy for total edentulism. However, there are major hurdles to accessing oral health care, which reduces total

demand for treatment (Narby et al., 2005). These constraints also make total demand contingent on available treatment alternatives and resources from the care provider and society, as well as many social and psychological processes that translate need into demand and demand into efficient use. These normally concentrate on oral reconstruction from a functional and cosmetic standpoint, rather than dealing with a life-threatening illness or mouth condition that necessitates compulsory intervention (Narby et al., 2007).

Socioeconomic status such as education level, income, employment status, and place of residence are strong predictors of dental care service utilization (Guiney et al., 2011). In our study, there was a significant correlation between full intention to complete the prosthetic treatment with age (20- 30 years old), residence, educational level and occupation. A Saudi study reported that age group, socio-economic status, and number of missing teeth were significantly associated with the knowledge of study participants regarding prosthodontic rehabilitation. The attitude of study participants was significantly associated with gender while practice regarding prosthodontic rehabilitation had a significant association with number of missing teeth and reason for not having prosthesis (Assery, 2019). In a study by Nirmal et al., (2014) lower expected outcomes, cost-related issues, and lack of awareness were the major factors associated with KAP of the study participants.

5. CONCLUSION

In conclusion, financial or economic situation seems to be the main predictor that would have potential influence on individuals' intention and behaviors towards their needs of prosthodontics treatment. There was a significant correlation between full intention to complete the prosthetic treatment with age, residence, educational level and occupation.

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Ethical approval

The research proposal was approved by the Regional Research and Ethics committee of King Abdulaziz University with Ethical approval number (296-10-21).

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Conflict of Interest

The authors declare that there are no conflicts of interests.

Data and materials availability

All data associated with this study are presented in the paper.

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